



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 2

290 BROADWAY

NEW YORK, NEW YORK 10007-1866

February 22, 2016

Peter P. Brussock, Ph.D.
The ELM Group, Inc.
4920 York Road, Suite 290
P.O. Box 306
Holicong, PA 18928-0306

Re: Berry's Creek Study Area
Development and Screening of Remedial Alternatives Memorandum

Dear Dr. Brussock:

EPA, NJDEP, NOAA and USFWS have reviewed the Development and Screening of Remedial Alternatives Memorandum (DSRAM), submitted November 24, 2015. A number of the comments are concerns from specific agencies which have been discussed previously, however without satisfactory resolution. EPA hopes that the Berry's Creek Cooperating PRP Group (BCG) will take this opportunity to respond to the comments and revise the alternatives as appropriate, or, provide detailed additional information to help the government reviewers better understand and accept the BCG's position.

It should be noted that EPA and the BCG have been discussing using a phased or adaptive approach to address the contamination in Berry's Creek. These discussions are still in the early stages, but it is important because such an approach will influence the alternatives to be evaluated in the detailed analysis.

Please address the following comments regarding the DSRAM:

REMEDIAL ACTION OBJECTIVES (RAOs) –

1. The RAO language needs to be revised. EPA will draft new language for the RAOs, and provide the BCG with an opportunity to discuss the changes. Of course, the RAOs will ultimately need to reflect the scope and implementation approach determined during our discussions of a phased or adaptive remediation process. The following comments should be noted, but specific revisions to the RAOs do not need to be made until EPA provides updated language:

- There is no mention of soil or sediment in the Ecological RAOs, which may (as indicated in the conceptual site models) result in unacceptable exposure and impacts to benthic invertebrates, fish, and other organisms through direct contact and/or ingestion.
 - Section 2.2, #2, second Human Health RAO: Does this RAO apply to both marsh and waterway sediments?
 - Section 2.2, footnote #2: Background does not belong in the RAOs. It will be considered during the development of site-specific PRGs.
 - The preliminary remediation goals will be selected by comparing risk assessment values as well as ARARs and To Be Considered (TBC) values as appropriate.
2. It is difficult to interpret (and would likely be difficult to achieve) Ecological RAO #3. It appears to **only** apply if it can be demonstrated that the COPCs in the BCSA have affected marsh plant or aquatic community diversity. This relies on teasing apart contaminant and physical stressors when they likely have similar effects; it does not account for impacts that may occur but are not measureable through diversity indices, and does not take into account contaminant impacts to individual species or to other communities (e.g., terrestrial birds).
 3. Page 2-1, Section 2.2 and Page 2-2, Section 2.3: Table 6-1 and Table 6-4 provide a rating system on the ability of an alternative to effectively achieve the Remedial Action Objectives (RAO). It is unclear in this rating system which RAO is being achieved, or if the rating system is inferring that implementation of one given alternative can effectively achieve all six RAOs once implemented. Please clarify rating system.
 4. Section 2.3 -The remedial action objectives include statements that mitigate ecological risks. These statements should be revised to indicate that these risks will be reduced or eliminated. The RAOs provided involve surface water, contaminants in tissue, and aquatic communities. There should be an RAO specifically for contaminated sediment. Additionally, one of the RAOs is based on a range of community-based metrics measured in references areas not impacted by the COPCs. Further information should be provided regarding the areas that are not impacted by COPCs.
 5. Ecological RAO #3 - determinations of biological integrity and aquatic community in a degraded environment is likely unattainable and therefore should not be an RAO. For an example, see Ranasinghe et al. 2009 for challenges in trying to assess benthic community condition.

Reference

Ranasinghe, J. A., S. B. Weisberg, R. W. Smith, D. E. Montagne, B. Thompson, J. M. Oakden, D. D. Huff, D. B. Cadien, R. G. Velarde, and K. J. Ritter. 2009. Calibration and

evaluation of five indicators of benthic community condition in two California bay and estuary habitats. Marine Pollution Bulletin 59: 5-13.

APPLICABLE, RELEVANT, AND APPROPRIATE REQUIREMENTS (ARARs):

6. New Jersey Coastal Zone Management: N.J.A.C. 7:7E has been incorporated into N.J.A.C.7:7 (7:7E is no longer effective, as of July 6, 2015).
7. The Migratory Bird Treaty Act (MBTA; 16 U.S.C. 703-712) should be included as an ARAR. The MBTA requires that Federal agencies consult with the Service during remedial design and remedial construction to ensure that the cleanup of the site does not unnecessarily impact migratory birds.
8. The presentation of chemical-specific values is inadequate. A variety of potential ARARs and TBCs exist, including sediment screening values, sediment quality benchmarks, water quality criteria, soil remediation standards, etc. Options should be compiled now for consideration and evaluation throughout the remedial alternative screening process.
9. In table 3-1, Potential ARARs and TBCs, the following should be added:
 - NJAC 7:26D – Remediation Standards
 - NJAC 7:26E – Technical Requirements for Site Remediation
 - NJDEP’s Ecological Evaluation Technical Guidance dated February 2015
- http://www.nj.gov/dep/srp/guidance/srra/ecological_evaluation.pdf
10. Table 3-2: ARARs. Essential Fish Habitat (ESF) should be added to the Table. The National Marine Fisheries Service recently has asked for more consultation at other Superfund sites in the northeast. We suggest you contact them along with that concerning the Endangered Species Act to discuss such a need given the possibility for the presence of ESF
11. Table 3-1 and Table 3-2: The Rivers and Harbors Act of 1899 is a “location specific” ARAR. Please move this ARAR from Table 3-2 to Table 3-1.

REMEDIAL ALTERNATIVES SCREENING

12. Section 6.3 Effectiveness Evaluation Criteria - Tables 6-1 and 6-4 where both Area Stability and Natural Recovery are equally used but, in reality, are not independent. Stability is a requirement for natural recovery, so any area estimated to be highly effective for natural recovery would also be considered highly effective for stability. This double counting will result in an artificial apparent weighting.

13. Page 4-2, Section 4.0 and Page 5-8, Section 5.2.5: The DSRAM states that “screening of remedial alternatives is not specific to particular waterway reaches or marsh subareas, quantities of material to be addressed were not calculated; thus, sediment management options are not specifically evaluated.” Please add a new footnote to Table 6-3 and Table 6-6 explaining that the relative cost comparison of alternatives does not account for sediment management options (such as effective management of on-site consolidation, off-site disposal, Best Management Practices, beneficial re-use of dredge material, and whether sediment removal occur in the “dry” or in the “wet”).
14. Page 4-2, Table 4-1: The list of refined General Response Actions (GRA’s) in Section 4 should include hydraulic/hydrologic controls. Please revise.
15. Page 5-8, Section 5.2.5.1: Please clarify why capping without partial sediment removal was not evaluated as a stand-alone alternative.
16. Page 5-11, Section 5.26: The DSRAM states that the marsh-only hydraulic control alternative “would potentially be considered as a stand-alone alternative for specific targeted areas or used with other alternatives as part of a combined remedy.” (a) Please clarify and explain which alternatives will or could possibly include hydrodynamic controls, and how hydrodynamic controls will improve the effectiveness of the stated alternatives in Table 6-1 and Table 6-4. (b) Please clarify if this alternative could be combined with a waterway alternative.
17. Table 6-1 (comment also applies to Table 6-4): Alternative 5 and Alternative 6 (Enhanced Monitored Natural Recovery Alternatives) state that “Pilot studies have documented that thin-layer placement plots have remained stable and in place.” During the RI field work, the BCG team have a self-imposed waterway speeds to reduce wake when passing pilot study plots. Please explain how boat traffic will impact stability of future thin-layer caps. Also, if “reduce wake” is required to maintain stability, then how will this requirement be implemented in the future.
18. Table 6-1 and Table 6-2: Waterway containment alternatives in Table 6-1 do not appear to evaluate potential flooding associated with an increase in bed elevation. It appears that the alternative with thin-layer placement assume that bed elevation will return to pre-cap conditions due to consolidation and compaction of underlying sediment (as stated in Table 6-2). In Section 4, the evaluation of consolidation is deferred to the future. For the detailed analysis of alternative, please document the projected time required for bed consolidation and compaction to occur. Based on the available hydrological model, please explain the flooding impact, if any, associated with placement of proposed thin-layer cap in Alternatives 5-7 if consolidation of compaction of underlying sediments does not occur completely.

19. Table 6-1 (comment also applies to Table 6-4): The “Summary Comments” (last column of Table 6-1) should acknowledge that sediment removal alternatives have been successfully implemented with the use of Best Management Practices to control sediment resuspension and residual. For Alternatives 7-9, please reword the following sentence as follows:
“Sediment removal could result in environmental risks associated with dredging such as resuspension of the bed sediment, release of contaminants from bedded and suspended sediments, and residual contamination. However, Best Management Practices will be implemented to reduce and mitigate these potential risks.”
20. Table 6-1 (comment also applies to Table 6-4): For Alternative 3 (Monitored Natural Recovery with Institutional Controls), please discuss the acceptable time frame when surface sediment concentrations will no longer pose a risk to ecological and human health receptors.
21. Page 7-1, Section 7: Per CERCLA guidance after the development of General Response Actions (GRAs), technologies types and process options are identified and evaluated. In Section 4, disposal and ex-situ treatment were included as part of the “Removal” GRA and evaluation was deferred to the detailed evaluation of alternatives. Both disposal (including beneficial use) and ex-situ treatment include several technology types and process options that should be evaluated. These steps are generally done prior to the development of alternatives and the detailed analysis. Please clarify in Section 7 that these steps will be incorporated in the future and alternative updated if necessary, prior to the detailed evaluation of alternatives.
22. Section 6.6.9, Alternative 9: “The placement of sediment with a grain size distribution different from the native material (e.g. replacement of organic mud with sand) would initially result in different habitat characteristics as well as redistribution of new sediment in the new channel as a new dynamic equilibrium is established over the range of flow conditions.”
Could we use sediment more similar in grain size to the native material to prevent major alterations to the system stability?
23. Section 6.6.9 Alternative 9 - The description of Alternative 9 involves the backfill of sediment using sand versus a material similar to what was removed. Further justification should be provided regarding the benefits of using sand.
24. It is recognized that this is a screening exercise, but suggests that the DSRAM would benefit from additional specificity regarding the effectiveness of each alternative in reducing human vs. eco-risk and in remediating risk from different contaminants. Additionally, it presents over-simplified and subjective ratings with respect to effectiveness, implementability, and cost, which lessens the usefulness of the alternative assessment. Some specific examples include the following:

- Institutional controls will typically only be effective in reducing human health risk, not in protecting ecological receptors.
- Treatment amendments and thin-layer placement may be effective for some, but not all, contaminants of concern, and may differ in the contaminants that each is most effective in addressing.
- The rankings for effectiveness and implementability are, in many cases, either over-simplifications, relative, or subjective. For example, Alternative 3 (monitored natural recovery [MNR], with institutional controls [ICs]) - is ranked as being “highly effective” in areas with lower risk or higher stability, while Alternative 2 (ICs alone) is ranked as “possibly effective” in areas with lower risk or higher stability. However, MNR itself does not provide additional effectiveness over ICs alone - regardless of area stability - it only allows for an ASM approach and the ability to institute other forms of control if the rate of natural recovery is not as rapid as expected. Therefore, while Alternative 3 (MNR + IC) is **preferable** to Alternative 2 (IC alone), it is not actually less effective. Similarly, Alternative 7 (partial contaminated sediment removal + capping + MNR + ICs) is classified as being “possibly effective” in areas with lower risk and “effective” in areas with higher risk; there is no reason to think this method would be less effective in low-risk areas – it is really that this alternative may not be as desirable in low-risk areas compared to high risk ones.

25. The importance of understanding natural recovery in the BCSA cannot be overstated.

Natural recovery is a major theme throughout the DSRAM and is mentioned 183 times in the document. Monitored Natural Recovery (MNR) is an element of all the proposed remedial alternatives, and “Natural Recovery Status” is one of three proposed effectiveness evaluation criteria. In addition, natural recovery is likely to be considered an important factor in any Adaptive Management plans and any remedial effectiveness monitoring. Although DSRAM states that “A detailed natural recovery analysis considers multiple lines of evidence”, comparing deeper to shallower sediment COPC concentrations will be an “important consideration.” However, major data limitations make it unlikely that a rigorous analysis of natural recovery rates is possible at this time for the following three reasons:

- a. High resolution core data, which may have data from multiple surface layers, cannot be assumed to be representative of all areas and should be considered to represent an upper bound on deposition and natural recovery rates.
- b. Many of the core samples do not include sediment from the 5-10 cm horizon, which hampers any ability to evaluate the pattern in COPC concentrations with depth.
- c. No unbiased BCSA surface sediment dataset currently is available that could be used to determine surface concentrations for the major areas and habitat types for temporal comparisons, which would be essential to evaluate model predictions of recovery rates in

specific areas. NOAA recommends the development of a robust sampling plan for the specific purpose of determining rates of natural recovery of surface sediment throughout the BCSA. The data from such a plan could be used to validate model predictions, evaluate remedial effectiveness, and inform adaptive management of the BCSA.

26. Section 7-1: Basis for the Planned Detailed Alternative Analysis Approach - COPC concentrations are elevated in biota, especially higher trophic species and the goal of remediation should be to ensure that these concentrations are reduced. While mercury concentrations may be lower in biota than sediment concentrations would predict, the same is not true for PCBs; please remove the sentence about sequestered COPCs in the marsh from the 4th bullet as it does not apply to all COPCs. The term “sequester” implies not bioavailable. Using the terms “higher” and “lower” in the 4th bullets sub sections is misleading since the “lower” concentrations are still exceptionally high compared to concentrations in marshes removed from sources of contamination. Net deposition may take extremely long time to have contaminants reduced to low/no risk concentrations.
27. The text states that the marsh burial is equal to sea-level rise. Please clarify in light of MERI (2015) which states that the 2008-2015 rate of elevation change in Hackensack River marshes was 3.18 mm in the *Phragmites* high marsh to 5.84 mm in *Spartina* low marsh; likely lower than sea level rise

Reference

Measuring Elevation Change in Meadowlands Marshes Using Surface Elevation Tables (SETs) and Marker Horizons. Meadowlands Environmental Research Institute (April, 2015)

28. Section 1.4.4.4: Natural Recovery -Tell us what the net sediment deposition observed is in BCSA and how this compares to other measurements in the Meadowlands. With regard to the statement “Thus, even absent any remedial activities, with continued declining sediment COPC concentrations, surface water concentrations would also decrease with time.” What is the expectation for MeHg concentrations in surface water in the future because of its different behavior compared to other COPCs?
29. Section 5.2.4.1: Alternative 4 – Direct Application - 2nd sentence of 1st paragraph add to sentence starting with “A primary exposure pathway in the BCSA” involve both direct contact with sediment and surface water and “bioaccumulation...”
30. Please clarify that the evaluation of Hg sequestration using amendments was much less successful than for PCBs.

31. Section 5.2.5: Removal Alternatives (Alternatives 7-9) - Middle of page 5-8 - The reference to NYDEC 2000: this document states that it is intended for voluntary restoration projects and not mitigation projects. If the decision is made to allow *Phragmites* to reestablish, then this reference is not relevant at all.
32. The BCG states on numerous occasions that it will be difficult to restore impacted wetlands. NOAA disagrees.
33. The potential use of amendments at the BCSA is quite possible. We have looked favorably upon the development, however, the potential impacts to the biota from the amendments should be discussed.
34. Table 6-4, Alternative #8, under Area Stability - Higher stability: Change X to a single check. Depending on the depth of removal, the marsh may return but of a different vegetative type

MARSHES

35. Table 6-2: Alternative 9 (sediment removal with back-fill) states that “Restoration of waterway channels and mudflat areas can be challenging and requires careful consideration of hydrodynamics and bed geomorphology to avoid destabilizing portions of the waterways or adjacent marshes.” During several data presentations, the BCG has stated that the phragmites roots have stabilized the marshes, and the geomorphology of the Berry’s Creek channel has not changed over time due to the phragmites roots (based on historical photographs). The Pilot Study plots have also documented that phragmites re-vegetate a disturbed area quickly. Please clarify the anticipated restoration challenges and the anticipated phragmites re-growth to assist with bank stabilization.
36. Table 6-4: (a) For marsh sediment removal (Alternatives 7 and 9), please clarify the statement “replacement and restoration of marshes in a tidal estuary can be challenging” since the pilot study plots have documented that phragmites re-grow quickly after land disturbances have occurred. (b) Given the habitat restoration challenges documented under Alternatives 7 and 9 (marsh sediment removal), it is unclear why impacts to habitat and habitat restoration are not thoroughly discussed in Alternative 10 (marsh hydrological controls). Please document the potential adverse effects to the marshes and habitat associated with insufficient sediment delivery or reduced inundation frequency.
37. Marshes tend to be stable geomorphic features of coastal systems. *Phragmites* keeps the marshes stable, but here are many similarly stable *Spartina* marshes, that many more ecologically valuable. The presence of *Phragmites* within the BCSA should be considered

when weighing the benefits of providing restored marshes that improve fish and avian habitat use, versus allowing recolonization by *Phragmites*.

38. Many restoration projects have been conducted in the Meadowlands that can be used to guide successful approaches and technologies. Marshes can be effectively restored without reducing stability.
39. Section 1.4.6 Management Considerations - A discussion of the marshes is included regarding the benefits of *Phragmites*. It may be helpful to also include the drawbacks of *Phragmites* (e.g., reduction in biodiversity).
40. Table 6-4: Alternatives 7 & 9, under Area Stability and Higher stability: It is suggested to change the X to a single check.
41. The stable marsh habitats in Berry's Creek are dominated by *Phragmites*, which is a rapid colonizing species; therefore, the concern about disturbance/loss and re-establishing the marsh is less applicable at this site.
42. The life cycle of *Phragmites* is such that "An individual plant can multiply into a large stand through its rhizomes. Rhizomes may exceed 60 feet in length, grow more than 6 feet per year and readily grow into new plants when fragmented." In addition "Mature plants produce as many as 2,000 seeds annually." Excavation of *Phragmites* marshes and return of *Phragmites* marshes should not be a concern for sediment removal alternative. Estuarine restoration science is advanced and successful projects are numerous. Elevation is the key to getting wetlands restored.
43. Section 1.4.4.2: Marshes - Different marsh locations may have different proportions for their sources of sediment. Please clarify whether the generalized statement about the Hackensack River providing sediment to all marshes applies to all the marshes, and how that varies.
44. Table 6-5: There appears to be much interest by the BCG to promote Thin Layer Capping. This type of capping likely allows the *Phragmites* to co-exist with such a remedy. Of course a dredging option likely will remove the *Phragmites*. But, as discussed before, such a remedial action can either 1. lower the profile allowing placement/natural creation of a native *Spartina* wetland. or 2. Provide the ability for *Phragmites* to reestablish itself. Alternatively, can a high salt marsh – *S. patens*, etc. – replace the *Phragmites* after removal. This may possibly provide the RPs credit for natural resource damages. They describe such new marsh creation as difficult to implement in #s 7 and 9. I disagree although, we agree, it might be costly. Additionally, a lowered profile will allow more tidal exchange potentially improving the low dissolved oxygen problems of the Upper Berry's Creek.

45. Section 1.4.5.2 Ecological Resources - In the summary of the habitat included in the Berry's Creek Study Area, key ecological receptors are provided for the waterway. However, it may be useful to also note key receptors that use the various marshes along the creek.

MISCELLANEOUS

46. Section 1.4.5.2: Ecological Resources – The agencies agree with the statement provided in the text: “Research has repeatedly demonstrated declines in assemblage richness, diversity, and biotic integrity with increasing urbanization (Walsh et al., 2005; Meyer et al., 2005).” However, the text does omit important site-specific information to describe the high value of this rare ecological resource, the largest continuous wetland area in the NY metropolitan area and located within the Atlantic flyway. Please include that the highly urban setting increases its resource value.
47. The RI Report should include a more complete summary of the evaluations and remedial actions for the landfills, which are mostly in Lower Berry's Creek.
48. Pg. 1-15, Sect. 1.4.4.3 - Please clarify the conceptual model of contaminants adhering to organic material, dissolved contaminants in surface water, suspended solids (inorganic and organic), transport, deposition, etc.
49. Section 1.4.4.3: Waterway Marsh Exchange - Is the majority of MeHg mass in the surface water column associated with suspended particulates? What percent of MeHg is adsorbed onto particulates?
50. Hg in *Phragmites* detritus and root is up to 3 ppm Hg which is still quite high so relative concentration is of lesser importance.
51. Section 1.4.4: 2nd bullet on Page 1-13 – MeHg is described as an exception to the general distribution of COPCs in sediment, but the actual description is not included. Please include.
52. Due to the low elevation of the site, storm surge and sea level rise (climate change) considerations need to be included with any discussion of alternatives.
53. Section 1.4.5.1: Land Management, Planning, and Human Population and Use – Certain reviewers believe there is more recreational use (fishing from the bridges and birdwatching) in and adjacent to the marshes than implied in the text.

REFERENCE AREAS/URBAN BACKGROUND

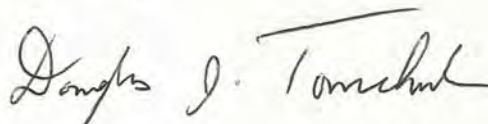
54. The use of the terms "urban background" and "reference areas" does not address previous agency concerns. The areas investigated as "reference areas" for the BCSA study include locations impacted by contamination, and the BCSA may have contributed contamination to several of the areas. Therefore, these "reference areas" are limited in their use as a comparison to contaminant stressors within the study area (as in the traditional evaluation of reference areas). In addition, these locations do not represent a generalized urban condition ("urban background"), given that the area used to define this urban condition in the BCSA includes numerous hazardous waste sites and landfills. While the agencies appreciate the potential recontamination issues caused by the regional conditions, the terminology should be consistent with that used at other sites.

SPECIFIC COMMENTS

55. Pg. 1-12, Sect. 1.4.3.2, 2nd para. – Please discuss the source of potable water in the BCSA.
56. Pg. 1-12, Sect. 1.4.3.2, 2nd para. – Although the groundwater in BCSA is not a current source of potable water, please clarify its groundwater class designation.
57. Pg. 1-14 - The text says that "... sources were removed ..." Please clarify that the text referred to the cessation of contaminant discharges and not to removal of contaminated sediment.
58. At the bottom of the section there is a typographical error. Note that the 2012 Site Characterization Report is Phase 2.

If you have any questions, please feel free to call me at 212-637-3956 or email at tomchuk.doug@epa.gov.

Sincerely,



Douglas J. Tomchuk
Remedial Project Manager
Central New Jersey Remediation Section